

| ALTERNATIVES FROM WATER SUPPLY PLANS FOR GROUNDWATER MANAGEMENT AREA LOCALITIES | | | | | |
|---|-------------------------------------|--|--|--|---|
| | New or expanding GW | New or expanding River Intake | New or expanding Reservoirs or Quarries | Purchase agreements/ Inter-connections | Other (Reuse, optimization, management, conservation) |
| Appomattox River Water Authority Regional Water Supply Plan | Y | Y - Appomattox | Y – Lake Chesdin | Y | Y – reuse, demand mgmt, conservation |
| Charles City County 2013 Water Supply Management Plan | Y | N | N | Y | N |
| Caroline County and the Town of Bowling Green Regional Water Supply Plan | Y | Y – Rappahannock | N | Y | N |
| Cumberland, Goochland, Henrico, and Powhatan Regional Water Supply Plan | Y | Y - James | Y – Cobbs Creek Reservoir, Sandy River Reservoir | Y | Y – conservation, groundwater mgmt policy |
| Greensville-Sussex-Emporia Regional Water Supply Plan | Y | Y – Nottoway River | Y – Emporia Reservoir | N | N |
| Hampton Roads Regional Water Supply Plan | Y incl. ASR | Y – no specific location, desalination | Y – no specified location | Y | Y – system optimization, reuse |
| Hanover County and Town of Ashland Long Range Water Resources Plan | N | Y – North Anna, Little River | Y – Verdon Quarry | N | N |
| King George County Water Supply Plan | N | Y – Rappahannock | Y - Upper Machodoc Creek, Pepper Mill, Pine Hill Creek | Y | Y reuse |
| Middle Peninsula Regional Water Supply Plan | Y | Y - Pamunkey | N | Y | Y – system upgrades, desalination |
| New Kent County Water Supply Plan | Y | Y – Pamunkey (reverse osmosis) | | Y | Conservation |
| Northern Neck Regional Water Supply Plan | N/A – water demand met through 2050 | | | | |

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|---|-------------------------------------|---|---|---|--|
| Northern Virginia Regional Water Supply Plan | N | Y – Potomac, Occoquan (reverse osmosis) | Y – Fairfax and Loudoun quarries | N | Y – “smart” irrigation systems, outdoor water use allocation calculations, informative billing |
| Spotsylvania County - City of Fredericksburg Regional Water Supply Plan | N/A – water demand met through 2050 | | | | |
| Stafford County Regional Water Supply Plan | Y | Y – Potomac (desalination) and Rappahannock tributaries | Y – Rocky Pen Run Reservoir, Abel Lake, Vulcan Quarry, others | N | N |

Statements of Need and Alternative Water Sources – York River, Rappahannock River, Albemarle-Chowan River, Chesapeake Bay – Small Coastal, James River, Potomac-Shenandoah River

Appomattox River Water Authority Regional Water Supply Plan

GWMA includes parts of Chesterfield and Prince George Counties east of I-95 and City of Hopewell; Prince George indicates a deficit by 2020, 2030, and 2040 Chesterfield County indicates a peak day deficit by 2040. Several alternatives are recommended for meeting this additional demand in the future: increases in current water supply allocations, new sales/purchase agreements, development of water reuse capacity, increases in water demand management and conservation efforts, and development of additional supply through new groundwater sources, raising the water level of Lake Chesdin, building a river intake on the Appomattox River, and development of a new surface water reservoir.

Charles City County 2013 Water Supply Management Plan

Water supply plan indicates a deficit by 2040. Additional groundwater sources are expected to meet demands in neighborhood service areas. Deficits in planned industrial areas (with no current source) may be met with interconnection with Henrico or Richmond.

Caroline County and the Town of Bowling Green Regional Water Supply Plan

GWMA includes portion of the county east of I-95; Indicates a deficit by 2030 and 2040. Alternative water supply sources listed in the plan include groundwater development, interconnection with other localities, and an intake on the Rappahannock River and construction of a WTF.

City of Richmond Water Supply Plan

The City of Richmond has sufficient water treatment and supply capacity to meet the city and its wholesale customers' water demand in the planning period, through 2060.

Cumberland, Goochland, Henrico, and Powhatan Regional Water Supply Plan

GWMA includes part of Henrico County east of I-95; no deficit for Henrico County indicated until 2045. Henrico County: (including demands of Goochland County that are met by Henrico County) Cobbs Creek Reservoir is the preferred alternative. For all four localities, including those not in the GWMA, several alternatives are recommended for meeting this additional demand in the future: the regional Cobbs Creek **Reservoir** project; continuing the existing **water conservation** policies or developing new ones; initiating discussions with Prince Edward County concerning the availability of water from the Sandy River **Reservoir**; **regional coordination** between the Department of Corrections and Goochland and Powhatan Counties to increase the withdrawal of water from an existing **James River water withdrawal**; developing and implementing **groundwater** management policies to manage the groundwater resources; and expanding existing **water purchase contracts** or developing new ones.

Greensville-Sussex-Emporia Regional Water Supply Plan

GWMA includes Sussex County only; alternatives listed for GCWSA. The GCWSA also plans to deepen/refurbish **groundwater** wells and dredge/refurbish the Emporia **Reservoir** if the storage capacity is reduced to 500 acre feet.

Hampton Roads Regional Water Supply Plan

Projected supply is anticipated to meet projected demand for the region through 2050. There is potential for demand to exceed supply by 2040 in the York-James Peninsula sub-region. Alternatives considered to meet the potential need in the Peninsula sub-region include additional **surface water storage**, additional **groundwater** withdrawals, **desalination**, **aquifer storage and recovery**, **interconnection**, **reuse**, and **system optimization**.

Hanover County and Town of Ashland Long Range Water Resources Plan

GWMA includes only the portion east of I-95; deficit anticipated by 2030. A single alternative is mentioned in the plan, the Verdon Quarry side storage **reservoir** project which includes: **river intakes** and raw water pumping stations on North Anna and Little Rivers, and a reservoir intake and raw water pumping station on Verdon Quarry.

King George County Water Supply Plan

Alternative water sources identified include wastewater **reuse**, **interconnection** with a neighboring locality, **reservoir** development, and an **intake** on the Rappahannock River.

Middle Peninsula Regional Water Supply Plan

King and Queen County existing sources appear adequate to meet current and projected demands through the planning period. Alternative sources listed for the Town of West Point include **system upgrades** and **groundwater** permit modifications that allow for greater use of existing wells. New **well development** and an **intake** on the Pamunkey River are King William County's preferred alternatives for source water.

New Kent County Water Supply Plan

In the short term, a **waterline extension** is being designed to connect two county-operated CWS to alleviate the anticipated 2017 deficit. The two top ranked alternatives for future water supply listed in the plan are an **intake** on the Pamunkey River (**reverse osmosis water treatment**) and the **purchase of water** from the City of Richmond.

Northern Neck Regional Water Supply Plan

Regional water supply appears to be adequate to meet demand through the planning period. Alternatives listed: water conservation, increased permitted withdrawal capability, new or refurbished groundwater wells, reclaimed water, desalination, rainwater harvesting, water marketing and transfer, development of a surface water reservoir

Northern Virginia Regional Water Supply Plan

GWMA includes only the portion of Fairfax and Prince William Counties east of I-95. The region's plan to address the projected shortfall of municipal supply includes constructing a **stream intake**/pumping station on the Potomac estuary below Little Falls (recently permitted by DEQ);

utilizing a **reverse osmosis membrane treatment plant** on the Occoquan estuary, using **quarries** located in Fairfax County to augment Fairfax Water storage, and using Loudoun County **quarries** to augment system storage (recently permitted by DEQ).

Spotsylvania County - City of Fredericksburg Regional Water Supply Plan

Existing water sources are adequate to meet current and projected demand. Only portion of Spotsylvania County east of I-95; no deficit indicated, but alternatives provided off-stream reservoirs, on-stream reservoirs, run-of-the-river intake, augmentation or modification of existing sources, quarry storage, groundwater, purchase water/interconnections, conservation measures, ASR, reuse, desalination.

Stafford County Regional Water Supply Plan

GWMA includes only portion of the county east of I-95. The region plans to address a projected shortfall of municipal supply by completing the construction of the Rocky Pen Run **Reservoir** project and pursuing other surface water and **groundwater** alternatives as needed. Additional alternatives listed in the plan include expansion of existing Abel Lake; increase dam height at Rocky Pen Run facility, development of **Potomac River and Rappahannock River tributaries** for surface water reservoirs (Austin Run, Aquia Creek, Potomac Run, Long Branch Creek, Alcott Run), development of offstream pumped storage reservoirs adjacent to the Rappahannock River (Alcott Run, Horsepen Run, Richland Run, increase to Rocky Pen Run facility), development of Vulcan **Quarry** offline storage reservoir adjacent to Aquia Creek, **desalination** of Potomac River water, and groundwater development.